



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,122	07/28/2003	David Coutu		3084

7590 10/05/2004
Richard A. Menelly
18 Saco Rd
Alfred, ME 04002

EXAMINER

DUDA, RINA I

ART UNIT	PAPER NUMBER
----------	--------------

2837

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/628,122

Applicant(s)

COUTU ET AL.

Examiner

Rina I Duda

Art Unit

2837

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☒ Claim(s) 17 and 18 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. Claims 17 and 18 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 17 only recites a method for limiting the maximum charge/discharge time of the current in one phase of a multi-phase step motor, but it fails to recite the necessary steps to accomplish said method and claim 18, which depends on claim 17, does not recite any method steps either. Therefore, the claims have not been searched.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 6, 7, 10, and 13-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Hart (US patent 5650705).

Art Unit: 2837

Claims 1 and 10, Hart teaches an apparatus/method for controlling a stepping motor comprising an H-switch circuit 30 connected to a motor phase, a switch driver 50 interconnected to the H-bridge, and means 70 including a set point generator and a bridge control circuit for controlling the current through the stepping motor 20.

Claim 6, Hart teaches means 40 connected between the set point generator and the bridge circuit 30 for providing a sign current to the bridge control circuit.

Claim 7, Hart describes in figure 2 a pair of upper switches and a pair of lower switches, wherein said switches are connected in parallel with the motor.

Claims 13 and 14, Hart describes r1 for determining an amount of current in one phase of a multiphase stepper motor, comparator u2 for comparing the current through one phase to a predetermined current 92 and reversing direction of the phase to reduce the phase current to the predetermined current.

4. Claims 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Hale et al (US patent 5343382).

Hale et al describes a current control circuit for motor 20 comprising means 40, 56, 58, 60, 62, and 64 for determining the PWM frequency to minimize current ripple and adjusting the duty cycle of the PWM signal in order to control current through the motor.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 2837

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-5, 8, 9, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hart (US patent 5650705) and Hale et al (US patent 5343382).

Claim 2, Hart describes the claimed invention except for the amplifier connected with the bridge circuit. But, Hale et al teaches a current control circuit for an electric motor comprising the comparators 52/54 for comparing a sensed current through resistor R10 to predetermined current, wherein said sensed current is connected to an operational amplifier for amplifying the voltage across the resistor before sending it to the comparators.

Claim 3, Hale et al describes phase current sensing resistor R10 connected to the input of the operational amplifier.

Claim 4, Hart describes u1 connected to the bridge circuit to provide forward current to the bridge circuit.

Claim 5, Hart describes u2 connected to the bridge circuit to provide reverse current to the bridge circuit.

Claim 8, Hale et al describes that their bridge circuit is PWM controlled.

Claims 9, 11, and 12, Hale et al describes that the duty cycle is varied in order to control the necessary switches from the bridge circuit.

It would have obvious to one person of ordinary skill in the art to use operational amplifiers connected to the current sensing resistor, since said operational amplifiers would amplified the small voltage signal across the sensing resistor which will later be

Art Unit: 2837

used by the voltage comparators to determined a reverse or forward current for the motor.

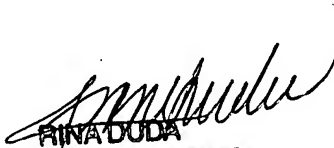
7. The prior art made of record and not relied upon is considered pertinent to applicant's invention. The documents cited describe other current control systems using H-bridge circuits.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rina I Duda whose telephone number is 571-272-2062.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin can be reached on 571-272-2107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RD


RINA DUDA
PRIMARY EXAMINER